

PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Improvements in or relating to Hair Conditioner

We, SALES AFFILIATES, INC., a corporation organized under the laws of the State of New York, one of the United States of America, of 801 Second Avenue, City and State of New York, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a novel hair conditioner and the novel method of using it on hair. More particularly this invention relates to a novel two-phase hair conditioner, one phase being an aqueous phase containing a quaternary ammonium compound and the other phase being immiscible with the water phase, and to a method of conditioning hair by the application thereto of said hair conditioner.

Some hair is naturally difficult to manage and to comb in the wet state, while other types of hair have become so as a result of the various treatments to which the hair has been subjected, such treatments including permanent waving, dyeing, tinting, frequent teasing, exposure to various atmospheric conditions, etc. Hair that has been subjected to an oxidizing condition, e.g., treatments with hydrogen peroxide or atmospheric oxygen photocatalyzed by sunlight, is especially difficult to comb in the wet state.

Many products are marketed for use at home and in the beauty shops to obviate and overcome the difficulty encountered in wet-combing. However, these products usually affect the hair's ability to maintain a set or coiffure. They render the hair limp and soft.

Some of the cream rinse products which provide good wet-combing of the hair, contain quaternary ammonium compounds. Their use produces a dilemma: their effectiveness as a wet-combing agent is proportional to the amount of cream rinse retained by the hair,

but the hair's ability to retain a set or coiffure is inversely proportional to the amount of cream rinse that remains in the hair. In other words, that which produces one desired effect interferes with the other effect. The loss of set retention is not overcome by the addition of greater amounts of setting agents.

It is an object of the invention to provide a hair conditioner containing relatively small amounts to a combing agent which will provide ease in wet-combing the hair but will not interfere with the hair's ability to retain a set.

It is a further object of the invention to provide a method of conditioning hair to prevent hair breakage as a result of combing tangled hair by the uniform application to hair of a two-phase hair conditioner containing an effective wet-combing agent.

In addition to the combing agent, the hair conditioner may contain set-retainers, sun-screening agents, color highlight agents, oxygen absorbers and/or nacreous agents.

We have, however, discovered a novel hair conditioner which contains a quaternary ammonium compound but which accomplishes both desirable features without the concomitant interference described above. Not only does the invention produce smooth and easy wet-combing, but at the same time it renders the hair amenable to coiffuring and to accept set-retaining agents.

Our novel hair conditioner consists of a two-phase solution, which may be combined into one bottle or kept separately until they are combined just prior to application to the head. They are a water phase containing a quaternary ammonium compound in exceedingly low concentration and a water-immiscible liquid phase. The two phases are normally in separate layers.

We have found that quaternary ammonium compounds containing a total number of carbon atoms of 15 or more, and having at

[Price 4s. 6d.]

least one alkyl group containing 10 or more carbons, are effective. The alkyl group may be saturated or unsaturated. We have found ALACSAN 7 LUF (oleyl dimethyl benzalkonium chloride), ARQUAD 2HT-75 (distearyl dimethyl ammonium chloride) and TRITON X400 (stearyl dimethyl benzyl ammonium chloride) to be most effective and ALACSAN is our preferred material. The words "Alacsan", "Arquad" and "Triton" are Trade Marks.

We have found that the concentration of quaternary ammonium compound in the water phase may be from 0.03% to 1.0% by weight. The best combination of smooth combing effect and ability to retain a set is achieved when the concentration is between about 0.05% to 0.125% by weight. While it is possible to achieve the desired effect on the hair to some degree outside these ranges, there is a mitigation of the set retention, as the concentration is increased and below this concentration there is a decrease in the ease of wet-combing.

We have found that the liquids comprising the water immiscible phase must have certain characteristics. They must be water immiscible and fast separating from water; the quaternary ammonium compound must be insoluble in them; they should evaporate at room temperature at about the same rate as water; they should desirably have a pleasant, or at least inoffensive odor; they should not have any water-solubilizing groups.

The number of suitable water immiscible compounds is thus restricted. Among those materials we have found satisfactory are:

Hydrocarbons—Those fractions which are largely made up of the petroleum fraction distilling within the range of 345° to 525°F. This includes deodorized kerosene fraction which distills between about 400° and 500°F. One of our preferred materials is the so-called "Iso-paraffinic" solvent produced synthetically, especially one distilling between 370° and 410°F. ISOPAR (99% saturated hydrocarbons—95% branched chain isoparaffinic, remainder naphthene type cycloparaffins) is particularly effective. The word "Isopar" is a Trade Mark.

Although there may be some ketones, ethers or alcohols which may be utilized in the invention, we have found these classes to be much less effective than the hydrocarbons.

The hydrocarbon compounds mentioned above are lighter than water and will separate as the upper layer. However, certain higher specific gravity products such as halogenated hydrocarbons have provide to be quite satisfactory. Chloroform or carbon tetrachloride can be used but compounds containing fluorine atoms are preferable, particularly from the toxicity standpoint, e.g., FREON 113 (trichlorotrifluoroethane) and FREON 11 (trichlorofluoromethane).

The following Examples illustrate the invention, apart from Example 2.

EXAMPLE 1

0.1 gm of ALACSAN 7 LUF (50% conc.) is added to water and further water to 100 cc is added and to 25 cc of this solution are added 5 cc of ISOPAR, forming a two phase two layer hair conditioner.

We have also found that we can combine two or more water immiscible liquids, especially those that are soluble in one another, e.g. unsubstituted hydrocarbons and halogenated hydrocarbons, in order to achieve faster layer separation, by combining liquids having different specific gravities. For example, ISOPAR and FREON 11 in various proportions will give excellent results. The word "Freon" is a Trade Mark.

EXAMPLE 2

4 cc of ISOPAR are added to 2 cc of FREON 11 and the mixture may be utilized as the water immiscible layer in the conditioner.

We have found that there is a wide range of feasible ratio between the water phase and the water immiscible phase. A 0.5:1 (volume to volume) ratio will function as well as a 30:1 ratio, but we have found that the most satisfactory range of ratios is 2 to 5 parts of water phase to 1 part of water immiscible phase.

If our water phase, which contains the quaternary ammonium compound, is used alone on hair, it will produce little, if any, effect on the wet-combing. The concentration of the quaternary ammonium compound is much too low. In those cream rinses previously discussed, the concentrations of quaternary ammonium compound are in the range of 2% to 5% by weight.

The water immiscible phase, alone, is incapable of producing a mitigation of the difficulty in combing wet hair or any like effect.

When the two phases are combined on the hair, the results are phenomenal. The ease of combining is equal to that of a large concentration and retention of quaternary ammonium compound, but the hair is able to retain a coiffure as if there were no such compound present. The two phases somehow interact to produce an effect which neither one alone is capable of bringing about. It is one of the most obvious and apparent manifestations of synergism. While the hair is wet with the conditioner the effect continues. However, having accomplished that which was intended, the water and water immiscible liquid are subsequently evaporated.

It is our belief that the water solution of the quaternary ammonium compound is absorbed quickly by the hair and that all of the surface of each hair fiber is coated by

the strongly ionizing, substituted nitrogen group, held by the amphoteric protein structure of the hair. The large hydrocarbon group on the quaternary ammonium compounds, being hydrophobic, will protrude perpendicularly, like whiskers, from the surface of the hair. The water immiscible liquid, also being hydrophobic, easily and readily will be set and held evenly by these hydrophobic groups. The less emulsified the liquid, the more easily and evenly distributed will be the water immiscible liquid, which forms a gel-like film over the hair surface. The more strongly hydrophobic, e.g., hydrocarbons or halogenated hydrocarbons, the better the distribution and the more effective the gel-like coating, which serves as a lubricant. As a result, the separation of individual hairs, even those with damaged surfaces, is accomplished easily by combing. Hair breakage and discomfort, injury, or at least pain, to the scalp is avoided. An important feature of the phenomenon is that any chemical soluble in the water immiscible liquid is evenly distributed over the hair surface. Upon evaporation of the liquid the chemical is deposited uniformly throughout the hair surface. This the chemical will produce a maximum effect on the hair although present in minimum amounts. The hydrobic "whiskers" will protect the deposited chemicals from rub-off and removal by water, bathing or perspiration.

We were also pleased that the hair was so uniformly treated by means of the invention. It appears that the water immiscible phase spreads readily and completely, carrying with it all the various components in the solution, and permits the use of very small amounts of components to produce effects normally achieved with much greater amounts of the components.

The nature of this two-phase system is truly unique and versatile. It enables one to produce various effects on the hair simultaneously without the usual difficulty of one effect interfering with the other.

For example, a water soluble hair setting agent such as mannitol, or polyvinylpyrrolidone and its water soluble co-polymers can be contained in the water phase, or it can be applied directly to the hair immediately after the hair has been treated with the two phase conditioner. The ease of the wet-combing will not be affected, nor will the setting agent be any less effective. The amount of setting lotion used would depend upon the desired degree of set retention.

EXAMPLE 3

ALACSAN 7 LUF (50% conc.)	0.12 gm
Polyvinylpyrrolidone-vinylacetate copolymer—E635 (50% conc.)	3.80 gms
H ₂ O	q.s. 100 cc

5 cc of ISOPAR may be added to 25 cc

of the above to produce the hair conditioner with set retention.

There are other materials which also may be contained in one or the other phase of our novel conditioner, or applied directly subsequent to applying the two-phase conditioner to the hair.

Sun produces an adverse effect on most hair, particularly hair that has been bleached or dyed. A water soluble sun screening ultra violet absorber, such as 2 - hydroxy - 4 - methoxy - benzophenone - 5 - sulfonic acid, can be added to the water phase of our conditioner, or it can be added separately in its own solution, while the hair is wet with the two phase conditioner. The uniform spread of the water immiscible layer will distribute the sun screen as well. A water insoluble sun screening agent, e.g., methylantranilate or menthyl salicylate, may be incorporated into the water immiscible layer, and the resulting film layer on the hair will resist removal by water, which would be encountered, for example, in swimming.

EXAMPLE 4

ISOPAR	100 cc
Methylantranilate	0.1 gm

5 cc of this solution can be added to 25 cc of a solution of 0.1 gm of ALACSAN 7 LUF (50% conc.) made up to 100 cc with water, to produce a hair conditioner having sun screening properties.

It is also desirable under certain circumstances that an oxygen scavenger be applied to the hair, e.g., after a peroxide bleach or permanent wave neutralizer treatment. An oxygen absorber such as monoethanolamine sulfite may be added to the water phase of the conditioner.

EXAMPLE 5

ARQUAD 2 HT (75% conc.)	0.1 gms
Monoethanolamine Sulfite	0.05 gm
H ₂ O	q.s. 100 cc

6 cc of the water immiscible phase of Example 2 can be added to 24 cc of this to produce a hair conditioner having an oxygen scavenger.

Many blue colorants are used to counteract the "brassy" effects, which frequently are found in bleached hair. The blue color tends to drab the yellow coloration, even in naturally white hair. Either the water phase or the water immiscible phase of the conditioner may contain such a colorant, e.g., D&C VIOLET #2 which is oil soluble, would be added to the water immiscible phase and, when the conditioner is applied to the hair, the colorant will be uniformly distributed thereon. In like manner a warm tone can be added to hair by use of a red color, such as D&C RED #17. The water soluble counterpart of these colors would be used in the water phase.

EXAMPLE 6

FREON 11 100 cc
D&C VIOLET #2 0.002 gm
10 cc of this solution may be added to 20 cc
of a solution of 0.12 gms of ALACSAN 7
LUF (50% conc.) dissolved in water and
made up to 100 cc, to provide a hair condi-
tioner with a color drabbing agent.

Highlights in the hair may be accomplished
by the addition of optical brighteners to either
phase, such as pyrazolinesulfonic acids. Oil
soluble or water soluble light fast colors may
also be added in small amounts. Unusually
satisfactory results may be obtained because
either an oil-soluble and/or water-soluble
material may be used.

EXAMPLE 7

ARQUAD 2 HT (75% conc.) 0.13 gms
TINOPAL RBS-200% 0.1 gm
H₂O q.s. 100 cc
24 cc of this solution may be mixed with 6
cc of FREON 113 to provide a hair condi-
tioner which provides the hair with unusual
highlights. Tinopal RBS is an optical
brightener manufactured by Geigy Chemical
Corporation. The word "Tinopal" is a Trade
Mark.

Higher boiling liquids, such as higher frac-
tions of mineral oil or esters of fatty acids,
e.g., isopropylmyristate, which would remain
on the hair surface and impart a high lustre
or sparkle to the hair, may be incorporated
into the water immiscible phase. Combining
these agents with the coloring materials we
can obtain unusual, colorful highlights.

EXAMPLE 8

ISOPAR 100 cc
Isopropylmyristate 0.1 gm
15 cc of this solution may be added to
15 cc of a solution of 0.13 gms of ARQUAD
2 HT (75% conc.) dissolved in water and
made up to 100 cc, to provide a hair condi-
tioner which imparts high lustre to hair.

Our novel conditioner may also be used
to achieve unique effects, such as pearlescence,
by incorporating a nacreous agent into the
water immiscible phase.

EXAMPLE 9

FREON 11 100 cc
GUANINE crystals. 1.0 gm
7.5 cc of this solution may be added to 22.5
cc of a solution of 0.1 gm of ALACSAN 7
LUF (50% conc.) dissolved in water and
made up to 100 cc, to provide a hair condi-
tioner which will add a dramatic pearlescent
effect to hair.

As indicated above, our novel hair condi-
tioner can be a one- or two-bottle system.
If it is a one-bottle system, the two phases
are incorporated in the preferred ratios and
in amounts required; if two bottles, they
are mixed in an applicator bottle in the propor-

tions prescribed. In either event the two
phases are shaken thoroughly immediately
before using. The bottle from which the
conditioner is applied should have a rela-
tively small opening, so that the application
is accomplished literally by sprinkling onto
the hair. It is preferred that the opening be
not greater than about 6 mm nor less than
about 4 mm, to insure the greatest ease of
application and to permit the most effective
interaction of the materials from the two
phases. It has been found that one ounce
of conditioner is sufficient for the average
head of hair.

Our conditioner may be applied to dry or
wet hair but best results are obtained when
tion and then the hair can be set and dried.
used, for example, after the final water rinse
following a shampoo, rinse, permanent wave,
bleaching or dyeing treatment. The condi-
tioner should be shaken evenly throughout
the hair, working it into the hair with the
fingers and then finally combing through to
insure even distribution. If the setting lotion
is incorporated into the conditioner the hair
may then be set and dried. If the setting
lotion is not incorporated it may be added to
the wet hair, combed through for distribu-
tion and then the hair can be set and dried.

The two phases of the conditioner evaporate
upon drying the hair, leaving behind the
setting film, the sun screen, the oxygen
scavenger, the optical brightener, or others
of said additives, each uniformly and evenly
distributed throughout the hair.

WHAT WE CLAIM IS:—

1. A hair conditioner comprising the com-
bination of a water phase layer containing a
quaternary ammonium compound having at
least 15 carbon atoms and at least one
saturated or unsaturated alkyl group contain-
ing 10 or more carbon atoms and a liquid
phase layer which is water immiscible and
fast separating from water, will evaporate at
room temperature at about the same rate as
water, does not have any water solubilizing
groups and in which the quaternary ammon-
ium compound is insoluble.

2. A hair conditioner as set forth in claim
1 in which the water immiscible liquid phase
contains a mixture of hydrocarbons.

3. A hair conditioner as set forth in
claim 1 or 2 in which the water immiscible
liquid phase contains a halogenated hydro-
carbon.

4. A hair conditioner as set forth in
claim 2 in which the hydrocarbons are a
mixture of halogenated and unsubstituted
hydrocarbons.

5. A hair conditioner as set forth in any
of the preceding claims in which the concen-
tration of quaternary ammonium compound
in the water phase is from 0.03% to 1.0% by
weight and the ratio of the water immiscible

liquid phase to the water phase is in the range of 1:2 to 1:5.

5 6. A hair conditioner as set forth in any of the preceding claims in which the quaternary ammonium compound is oleyl dimethyl benzalkonium chloride and the water immiscible phase is a mixture of branched chain isoparaffinic hydrocarbons and cycloparaffinic hydrocarbons.

10 7. A hair conditioner as set forth in any of the preceding claims in which a water soluble hair setting agent is contained in the water phase layer.

15 8. A hair conditioner as set forth in any of the preceding claims in which an ultra violet absorber is contained in the water phase layer.

20 9. A hair conditioner as set forth in any of the preceding claims in which an oxygen scavenger is contained in the water phase layer.

25 10. A hair conditioner as set forth in any of the preceding claims in which an oil soluble color is contained in the water immiscible phase layer.

30 11. A hair conditioner as set forth in any of the preceding claims in which an optical brightener is contained in either of the phases of the conditioner.

35 12. A hair conditioner as set forth in any of the preceding claims in which an ester of a fatty acid is contained in the water immiscible phase layer.

13. A hair conditioner as set forth in any of the preceding claims in which a nacreous agent is contained in the water immiscible phase layer.

14. A method of conditioning hair comprising the application to hair of a hair conditioner containing the combination of a water phase layer containing a quaternary ammonium compound having at least 15 carbon atoms and at least one saturated or unsaturated alkyl group containing 10 or more carbon atoms therein and a liquid phase layer which is water immiscible and fast separating from water, will evaporate at room temperature at about the same rate as water, does not have any water solubilizing groups and in which the quaternary ammonium compound is insoluble. 40 45 50

15. A method of conditioning hair as set forth in claim 14 in which the hair conditioner contains a sun screening agent or an oxygen scavenger. 55

16. A method of conditioning hair as set forth in claim 14 or 15 in which the liquid phase layer of the hair conditioner contains a fatty acid ester or a nacreous agent.

17. A two phase hair conditioner substantially as hereinbefore described with reference to any of examples 1 and 3 to 9 inclusive. 60

18. The method of conditioning hair by applying to hair a two phase hair conditioner substantially as hereinbefore described. 65

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